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measures, etc. There are also two classified indexes, but no general one.

No attempt can be made here to review with any real thoroughness this important and interesting contribution to the ever fascinating study of Rome. One or two special points of excellence, however, may be noted and a few rather trivial defects pointed out which might easily be remedied in another edition.

The student will be glad to have in a work so readily accessible as this book is the discussion of the earliest settlement on the Palatine in the light of the excavations at Antemnæ and at Castellazzo di Fontanellato. No doubt deeper excavations are necessary before any clear idea of the pre-historic settlement in Rome can be gained; yet, with a knowledge of the lay of the land and of the settlements which must have had many points in common with that on the banks of the Tiber, the beginnings of the city are removed from the domain of pure speculation. It is pleasant, too, to note that a rational explanation of the dark rooms in Caligula's palace may now be read by the visitor to the Palatine, and that he will no longer be asked to believe that the beautiful decorations were never seen except by artificial light. It is, however, to the account of the Pantheon, the most impressive structure in our heritage from ancient Rome, that the average reader will turn with keenest interest. Doubtless many knotty questions about the building have not been and perhaps never will be solved, but the most recent and very important studies of it have developed the cardinal fact that the present structure dates from Hadrian and is not Agrippa's at all. Agrippa's structure was probably of a different shape and faced south instead of north. It appears to have looked out on a circular open space which was paved and which was enclosed by a wall that is concentric with the foundations of Hadrian's Pantheon. Unfortunately, it is still a mystery what the relation of the building to the thermæ was. Lanciani's account of this complicated architectural problem is a model of clear, simple statement, quite free from the vice of claiming results which it is not possible to prove.

It would be easy, if it were worth while, to extend in detail an enumeration of the many

excellent features of this handbook, but it is not so easy to discover its defects, which at best are insignificant. In the first place there should be a good map of modern Rome in the book. The lack of this is occasionally an annoying omission, as an attempt to follow out carefully the account of the bridges, pp. 16 ff., will show. A new general map of the Palatine would be an improvement. Many students of Greek sculpture will quarrel with the positive attribution of the 'Venus Genetrix,' p. 301, to Arcesilaus, and they will miss, p. 415, a reference to the publication in the *Antike Denkmäler* of the remarkable relief on the marble throne of the 'Venus Sallustiana.' Very welcome, however, is the publication of the beautiful Greek head on p. 177.

The English of the book is simple and clear, with almost no traces of foreign influence. On pp. 62 and 104 'designs' and 'designed' are not used in accordance with our idiom. 'Hedra,' p. 176, can hardly be justified, and the spelling 'Polykletos,' p. 215, is rather a flagrant example of the confusion we have fallen into in the transliteration of classic names. The German 'Poebene,' p. 115, even in quotation marks, is scarcely better than Valley of the Po or Po Valley, and it is questionable whether 'unities' (*once*) of water, p. 184, will be readily understood.

The publisher's work has been well done, though the volume is heavier than one could wish. There is a trifling misprint in 'tribute (sic) of the plebs,' on p. 117.

J. R. WHEELER.

Les Cécidomyies des céréales et leurs parasites.

By DR. PAUL MARCHAL. *Annales de la Société Entomologique de France*, Volume LXVI. 1897. Pp. 1-105; Plates I.-VIII.

This paper, which has just come to hand, is, taking it all in all, the most important contribution to a knowledge of the Hessian fly in Europe which has ever been published. It contains also studies of a very great biologic interest, especially with regard to the larval development of certain of the parasites of the larva of the Hessian fly, and it is especially in relation to these observations that this review is submitted. Dr. Marchal has studied carefully the life history of *Cecidomyia destructor* in

France, his attention having been called to the species by extensive damage in the Vendée during 1894. He shows that, although previous writers in many countries have given three as the maximum number of annual generations, in France there may be developed, under the most favorable circumstances, six such annual generations. The most part of these, however, are partial, and the most incomplete are the third, fourth and sixth. He has shown that there is a considerable retardation of development where humidity is lacking, dryness having been responsible for a retardation of two months. An interesting section on natural selection concludes with the statement that, far from being adapted to climatic conditions by natural selection, the species is perpetuated in spite of obstacles placed in its way by exterior conditions, and that it overcomes these obstacles only by its fecundity and by the great variability of its biologic cycle. Careful studies are given of other species of Cecidomyiidae affecting grasses and grains in Europe and elsewhere, and especially of *Cecidomyia avenæ*, a closely allied form which the author has differentiated from the Hessian fly.

The observations made on the biology of parasitic insects are nothing less than remarkable. The larval development of internal feeding insect parasites is, of course, very difficult to observe. Few observations of value are recorded. The well known studies of Ganin on certain Platygastera were the earliest. The studies by Bugnion on the structure and life history of *Encyrtus fuscicollis*, an internal parasite of the European *Hyponomeuta cognatella*, are the only ones of importance which have appeared since Ganin. All of the species of the genus *Trichacis* are parasitic within the bodies of Cecidomyiid larvæ, and the genus is closely related to the form studied by Ganin. According to Marchal the first larval form of *T. remulus* corresponds to the type of the curious cyclops-like larvæ studied by Ganin, and which certain authors regard as an adaptive form, while others see in it an ancestral form. The post-embryonic development, according to Marchal, is as follows:

When they are young and motionless, and have not issued from the cysts which contain

them, these larvæ are always lodged in the interior of the nervous system of the host larva, and there they bring about alterations and proliferations of a very curious character. The most frequent is at the posterior extremity of the nerve chain, where the cyst of the parasite is formed. This extremity spreads out into an enormous bouquet of club-shaped giant cells, which alone fills the larger part of the body cavity of the host. The larva of the parasite is lodged in a cyst filled with liquid, the cellular structure of which, with broad, polygonal contour, seems to indicate an amniotic envelope in a condition of retrogression. All around this membrane the giant cells are grouped. These exist not only in the immediate neighborhood of the cyst, but all the surrounding region of the nerve chain seems to have undergone the same degeneration and growth of giant cells. The youngest cells are hyaline and present a fibrillous, longitudinal structure. The oldest cells are filled with fatty globules and become entirely opaque. The giant cells increase and isolate vesicles, which separate and fall into the body cavity in the form of protoplasmic spherules, which are absolutely characteristic. When one dissects a Cecidomyiid larva under the microscope he can be sure, if he sees these spherules floating in the liquid, that there are in the preparation one or more larvæ of this parasite. The localization of the larvæ of the *Trichacis* in the nerve chain or in the nerves of the larva presupposes that the parasite pierces the egg or the young larva upon the median ventral line at the time when the nervous system has not begun to branch and is concentrated in a single ventral band. The mass of giant cells accumulate in themselves evidently the nutritive material necessary to the parasite. They are a kind of internal animal gall, developed by the presence of the parasite. The *Trichacis*, in the condition of the cyclops-larva, waits in its cyst until the tissues which surround it have submitted to the transformations by which it profits later for its food; then, when the host larva, exhausted by its presence, is transformed into a sort of a sac filled with giant cells, it issues from its cyst to devour the accumulated material, which, probably, has nutritive qualities

nearly identical with those of the vitellus. After undergoing successive transformations into three larval forms the adult insect finally issues from the puparium of its host, only one adult finally making its appearance from an individual puparium, although in the cyclops stage four larvæ may be present. There seems, in this first stage, to be a physiological competition between *Trichacis* larvæ, only the oldest surviving to take on its second stage. An interesting point is that there appear to be definite molts from the first to the second and from the second to the third stage, and that the dead bodies of the cyclops larvæ which succumb do not interfere with the development of the survivor.

Careful observations have also been made with an allied parasite, *Polygnotus minutus*. The larvæ of this species, instead of being localized in the nervous system, as are those of the *Trichacis*, are found in the gastric sac, where there are found a number of 10 or 12 grouped together, developing simultaneously, and all, or nearly all, destined to reach the adult condition. The group of young larvæ forms a mass situated in the interior of the stomach. It is surrounded by a hyaline and, perhaps, adventitious membrane. Each parasitic embryo is also surrounded by a membrane of its own. The larva is elliptical, somewhat attenuated at its posterior extremity, and provided with rather well developed mandibles. They fill the gastric cavity, which is generally distended. The second and third larval forms follow. The host is almost entirely devoured and reduced to a cutaneous sac. When ready for pupation they occupy the entire body cavity of the host, the skin being distended and showing by impressions the positions occupied by the contained parasites, thus appearing full of minute cocoons.

It is strange that a field of such great biologic interest as the development of these insect parasites has been neglected to a striking extent. The difficulties which once surrounded the technique of such studies have been brushed away by the discoveries of modern morphologists, and a great field is open to the first well equipped worker who cares to enter it.

L. O. HOWARD.

L'Année psychologique, 3me Année. Publiée par M. ALFRED BINET. Paris, Alcan. 1897. Pp. 825.

The three years of this annual have now made for it an established place among psychological journals, and furnish gratifying evidence of the introduction in France of sound laboratory methods in dealing with all phases of mental activity. M. Binet has established at the Sorbonne a laboratory where the abnormal and the startling, so closely associated with French psychological research, do not constitute the main field for investigation, but where problems more nearly approaching those of most other psychological laboratories awaken chief interest and receive valuable contributions toward their solution. The present number confines its original contributions, of which a brief analysis is given below, more strictly than before to the announcement of results of research at the Sorbonne, and gains thereby a decided advantage in reduction in size. One of the main interests of this laboratory at present is evidently the problem of the relation of blood-circulation to mental process. Its discussion occupies more than half the pages devoted to original matter. The problem is one of large importance to psychology, and it is being materially advanced, both as to method and as to established facts, by such work as is here reported. In addition to its original articles the *Année* contains as usual careful analyses of the psychological literature of the year (pp. 335-688), and the bibliographical index of *The Psychological Review*.

(1) *L'abstraction des émotions* (Pp. 1-9): TH. RIBOT. Abstract emotions can exist to a very limited extent. They are formed by the combination of characteristics common to various particular emotions, without losing wholly their true affective tone. Such terms as: 'spirit' of a country, of a place, of an opera, etc.; 'moral environment,' and 'moral atmosphere,' express such a condensation of emotions. Other examples are found in certain æsthetic works, especially those of the symbolists.

(2) *Les changements de forme du pouls capillaire aux différentes heures de la journée* (Pp. 10-29): BINET and COURTIER. Many variations exist in the form of the capillary pulse in dif-